

**WHAT IS CLAIMED IS:**

1. A fiber optic sensing loop, comprising:  
  
a predetermined length of optical fiber, the optical fiber having a core and a cladding,  
  
wherein the predetermined length of optical fiber is wound in a substantially circular pattern, successive turns of the optical fiber being in contact with one another, and  
  
wherein at least portions of cladding of the optical fiber that are in contact with each other are fused together thereby forming a substantially integral optical fiber sensing loop.
2. The fiber optic sensing loop of claim 1, wherein the successive turns of the optical fiber are arranged in one direction.
3. The fiber optic sensing loop of claim 1, wherein the successive turns of the optical fiber are arranged in two directions.
4. The fiber optic sensing loop of claim 1, wherein the system exhibits isotropic properties.
5. A fiber optic sensing coil, comprising:  
  
an optical fiber including a core and a cladding around the core,  
  
wherein the optical fiber is wound into a plurality of concentric cylindrical layers, each of the layers including a plurality of turns of the optical fiber, and cladding of the optical fiber in the plurality of concentric cylindrical layers and cladding of the optical fiber in the plurality of turns are fused to one another at points of mutual contact.

6. The fiber optic sensing coil of claim 5, wherein the optical fiber is wound in one direction.
7. The fiber optic sensing coil of claim 5, wherein the optical fiber is wound in two directions.
8. A method for manufacturing a fiber optic sensing coil, comprising:  
winding a predetermined length of optical fiber in a substantially circular pattern such that successive turns of the optical fiber are in contact with one another, the optical fiber having a core and a cladding, and  
fusing the optical fiber so that at least portions of cladding of the optical fiber that are in contact with one another are fused together thereby forming a substantially integral optical fiber sensing loop.
9. The method of claim 8, wherein the method further includes removing a coating of the optical fiber.
10. The method of claim 8, wherein the optical fiber is wound in one direction.
11. The method of claim 8, wherein the optical fiber is wound in two directions.
12. A method for manufacturing a fiber optic sensing coil, comprising:

removing a coating made of a polymer composition from an optical fiber including a core, a cladding and the coating;

winding a predetermined length of the optical fiber in a substantially circular pattern, wherein successive turns of the optical fiber are in contact with one another; and

fusing the cladding of the successive turns of the optical fiber to one another at points of mutual contact.

13. The method of claim 12, wherein the optical fiber is wound in one direction to form a coil.

14. The method of claim 12, wherein the optical fiber is wound in two directions.